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J. McKEEN CATTELL AND AMERICAN SCIENCE

By
STEPHEN SARGENT VISHER
INDIANA UNIVERSITY

AMERICA has so notably improved its rank among the nations in scientific achievement that it is reasonable to inquire why. In the generation before 1900 it had contributed less to total scientific advancement than had a dozen European countries. It had, to be sure, about 1900 attained perhaps second or third place in geology and paleontology and fourth or fifth place in zoology, but in most sciences the country stood considerably lower. By 1947 it had risen so notably that it led in most sciences and was surpassed in total recent scientific contributions by perhaps no other country.

The spectacular rise in a half century was due, of course, to the combined effects of numerous influences. Some of the most potent of these were:

1. America's great wealth, which reflects perhaps chiefly its great natural resources. The United States is much richer in this respect than any other country. Russia, despite its much larger area, is poor in comparison, possessing even of its chief natural resource, land, much less agricultural land classed as grade one by the experts who consider all the essential qualities, of requisite warmth, adequate and dependable moisture supply, fertile soil, gentle topography but sufficient slope so that the land is well drained. Such countries as Germany, France, and the United Kingdom, although possessing considerable amounts of high-grade agricultural land, are far behind the United States in this respect, partly because of their smallness. A natural resource far less significant than superior agricultural land is that of mineral wealth. Though most of the richer countries possess considerable supplies of one or two minerals, none is as fortunate as the United States with respect to large amounts of favorably situated, important minerals. To be sure, the United States is by no means able readily to meet its full needs of several minerals, notably tin, nickel, bauxite, diamonds, platinum, potash, and various rather rare minerals used in alloys or technical instruments. Moreover, although because of its very extensive use of minerals, large quantities are imported of some of which there is a large domestic output or supply, for example copper, petroleum, and potash. Nevertheless not even the combined resources of the British Commonwealth are as great as those of the United States. In forest

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wealth also, although the United States uses so much lumber and newspaper wood pulp that much is imported, no other country is as rich in forest wealth. The vast acreages of forests of Canada, Siberia, and Brazil are misleading and have lesser value comparatively because of poor quality or inaccessibility or both. Similarly, in water power, as in coal, oil, or gas, the United States is relatively very well endowed.

Although America's wealth has undoubtedly contributed to the great advance in science, it appears altogether probable that it is merely an advantage. In certain other lands and also in parts of America prosperity has not induced scientific advancement. On the contrary, wealth often appears to interfere.

2. Another cause of the rapid rise in science in the United States in the past half-century has been the rapid increase in population, but this clearly is not a major cause, because several other countries have had even greater relative or absolute increase in that period without a commensurate increase in scientific rank.

3. The notable rise in average educational attainment of the people which occurred in America in that half-century is of course significant, but that it was not a major influence is suggested by the fact that illiteracy decreased even more strikingly in Japan and Russia, and that even now the United States is well behind several European countries in the level of conventional education.

4. Presumably much more significant than the previous three influences in causing the great rise in scientific output in America during the past half-century was the establishment at Johns Hopkins University of the first real American Graduate School. President Daniel Coit Gilman (1831–1908) assembled, especially 1878–1890, a faculty including many exceptionally able men enthusiastic in the advancement of science. They attracted and greatly stimulated numerous able students, many of whom later became renowned for their research. The outstanding success of the Johns Hopkins University Graduate School induced various other schools to evolve into universities with strong graduate schools and much emphasis on research. Notable examples were Columbia, Cornell, and Harvard. Three new institutions, modeled in part after Johns Hopkins, were established: Clark University (1888), of which one of the more successful Hopkins professors, G. Stanley Hall, was president; the University of Chicago (opened in 1892); and Stanford University (opened in 1892). The combined effects of these developments certainly were a major influence in America's rise in scientific rank in the half-century under consideration.

5. Other developments contributing to the rise were the establishment of the Carnegie Institution of Washington in 1901, under the presidency of Dr. Gilman, who had just retired from the presidency of Hopkins. This institution not only afforded opportunities for much research, but the results were effectively published and distributed. The Rockefeller foundations contributed much also, including the financing of highly significant postdoctoral fellowships. The Guggenheim Foundation Fellowships (1925) should also be included in a list of contributing factors. Of course the large Carnegie, Rockefeller, and Guggenheim grants-in-aid of research reflect the great wealth of America, but do more than that. (Some of the world's most wealthy men have been residents of India, South America, Europe, Japan, but have not supported research.)

6. An important influence was that of J. McKeen Cattell (1860–1944), who contributed notably to the great rise in science in America during the past half-century. Cattell did this in several ways. He founded and was editor 1894–1944 of the weekly scientific journal, *Science*, which became the organ of the American Association for the Advancement of Science. He purchased in 1900 and edited until 1943 a scientific monthly (*Popular Science Monthly* until 1915, when it became *The Scientific Monthly*). He established in 1907 and edited until 1940 *The American Naturalist*, a bimonthly scholarly journal. He established in 1915 and edited, except for short intervals, until 1939 the weekly educational magazine, *School and Society*.

These four journals were highly significant as media of publication in rather broad fields, and as sources of news of scientists. Indeed they were a major contribution to the advancement of science. He also was a councilor of Science Service, 1920–1937, and of the National Academy of Sciences, 1930–1936.

Possibly even more significant than the foregoing, however, was Cattell's biographical directory, "American Men of Science," of which seven editions appeared, 1906–1944. The most unusual aspect of this directory is the special occasion for this article. Cattell in 1903 undertook to find out who were the 1,000 most significant scientists in research in America. The techniques which he used are summarized in the following quotation from an article (by the present writer).[1]

> Cattell asked 10 outstanding leaders in each of 12 sciences to list in order of merit the leading research scientists in their science. These 120 judges were well distributed geographically, represented several different educational institutions and were considered to have good judgment. From their lists, Cattell worked out the average rank of each of the scientists voted upon. The number selected in each science to make up the 1,000 was approximately one fourth of the number of such scientists

[1] *Science*, Vol. 106, pp. 359–361, October 17, 1947.

then productive in America. Biographical sketches were obtained of all the scientists of 1903 judged worthy of sketching in a biographical directory. When the first directory of "American Men of Science" was published in 1906, asterisks were inserted to indicate the 1,000 leaders. The directory proved so widely useful that later editions were issued in 1910, 1921, 1928, 1933, 1938, and 1944. Successive editions contained an increasing number of sketches, approximately 4,000, 5,500, 9,500, 13,500, 22,000, and 34,000.

For the second edition, voting on starring was done by all living starred scientists who would co-operate. For subsequent editions, all those nominated by a number of persons as meriting starring also were asked to vote.

The decision as to which fields of work were to be recognized by having its leaders starred was made personally by Cattell. He chose anatomy, anthropology, astronomy, botany, chemistry, geology, mathematics, pathology, physics, physiology, psychology, and zoology. Thus even the most eminent workers in other fields were not eligible for a star. Moreover, a man who worked between well-recognized fields, in biochemistry, geophysics, or astrophysics, for example, or whose work overlapped two or more sciences, as does that of many ecologists and biologists, was rarely starred unless highly distinguished.

Another arbitrary decision made by Cattell was that few workers in applied or "practical" sciences were classed as meriting sketching in "American Men of Science." This is significant because in 1903 the number of persons to be starred in any field was, it will be recalled, approximately one fourth of the number judged worthy of a sketch in "American Men of Science."

An especially significant decision by Cattell was that . . . new stars should be added only in such numbers as to preserve the percentages assigned to each science in 1903. . . . Because the number of scientists grew much more rapidly than the number of stars allowed, the proportion of scientists starred has decreased rapidly. (1,000 were starred in 1903, 250 approximately for each later edition except the third, 1921, when 351 were starred.) For example, in 1943 about 34,000 scientists were judged worthy of sketching in "American Men of Science," but only 256 were newly starred, or approximately 1/32 as many as there were scientists newly sketched in "American Men of Science" since the previous starring. The total number of scientists newly starred in the fourth to seventh editions inclusive was about 1,000, or only 1/25 of the number who attained in those years sufficient scientific standing to be judged worthy of sketching in "American Men of Science." . . .

Despite imperfections of methods of starring, it is considered by numerous competent men to have made a notable contribution to scientific progress. The following summary by the present writer, from a study of starred psychologists in the *American Journal of Psychology*, 52: 278–292, April, 1939, may be quoted in this connection.

Cattell's inauguration of the system of starring the leading research workers in each of 12 fundamental sciences is considered by competent judges to have been a major contribution to the growth of research in America.

The star indicates that, in the private opinion of his peers, the starred scientist is distinguished for research. It implies either a large volume of good work or a considerable amount of especially original work. Of course it does not imply that the work done by others is not decidedly worth while, but merely that it has not impressed the voters as quite so worthy of approbation.

The star is a recognition which not only gives the recipient satisfaction, but also increases his opportunities. It is a challenge to the recipient to continue his good work and to others who aspire to win this recognition. Vast amounts of good work have been completed as a result of this friendly rivalry. Many scientists who are not starred feel confident that they are "as good a man as . . ." and consequently set out to prove it.

The good that starring does is increased by the widened knowledge as to who are starred and why. This widened knowledge not only encourages and puts the starred men more fully on their mettle, but it also attracts attention to their work and increases their opportunities for further research. It, moreover, augments the opportunities of promising persons not starred in the hope that, as a consequence of encouragement and improved facilities, they will win this coveted recognition. The various universities employing starred scientists are placing increased value upon this recognition as a proof of individual merit and institutional strength. They not only attempt to retain and attract men already starred, but also to have local men not yet starred win this high honor; to this end they often increase facilities and otherwise encourage their more promising men.

Among the 770 starred scientists whose replies to a recent questionnaire expressed opinions as to the influence of the star on their own careers, nearly three fourths reported that the star "improved their status." . . . Most of the 160 who reported no improvement were starred late in life; a considerable number specifically stated that their stars came too late.

More than three fourths of those reporting considered that "starring has in general been beneficial." . . . Only 6 considered starring harmful.

According to nearly nine tenths of those replying, starring would be beneficial "if in the future stars are awarded to the top 10 per cent of the workers active in research in numerous fields (not only the present 12), by secret vote of the top third or so of the active workers in that field."

Cattell's system of starring and his other achievements won him many honors and opportunities to serve at a high level. He was president successively of Sigma Xi, 1913–1915, of the Psychological Corporation, 1921–1926, of the American Association for the Advancement of Science, 1924, of the International Congress of Psychologists, 1929, of Science Service,

1928–1937. (Science Service has done much to make more widely known scientific achievement in America, partly through its popular weekly *Science Newsletter* and partly by supplying science news to the press.)

It is, of course, impossible to know how much influence Cattell had in the advancement of science in America during his very long active life; he was active until he was 83. But it appears highly probable that his influence was sufficiently abundant to justify this summary. A suggestive bit of evidence of his influence is seen in the comparatively much lesser development, 1903–1943, in America of those sciences which Cattell did not recognize by starring their leaders. Indeed, the great stimulation which public recognition by starring afforded to the workers in the 12 sciences which he recognized tended to attract ambitious young scientists away from sciences in which public recognition is not so available. The high significance of encouragement and public recognition has been abundantly acknowledged by many scientists, including most of the 906 starred scientists who filled out the present writer's comprehensive questionnaire of November, 1946. They were asked concerning the influences which had helped their scientific achievement.

Cattell's influence, in conclusion, was highly significant in the history of American science from 1888, when he became professor at the University of Pennsylvania, to 1944 in several ways. These include as a scholar, teacher, founder and editor of important scientific journals, and especially for his initiation of more effective methods of public recognition of scientific achievement. The limitations of his system of starring, mostly due to its being a pioneer effort, should not be allowed to detract from the appreciation of it by students of the history of science. Instead, starring, now that it has been proved to be highly significant, should be extended to many fields in addition to the 12 with which Cattell started. To be starred by secret ballot of the more competent workers in one's field not only greatly encourages the person so starred, but it increases the effectiveness of his work by calling attention to it. Of even greater importance, such public recognition encourages others to qualify by accomplishing more good work and leads to a wider public appreciation of research.

Events . . .

MASS MEDIA OF LEARNING

CONSIDERABLE attention is beginning to be devoted to the use of mass media of communication, that is, of radio broadcasts, moving pictures, film strips, and other types of audio-visual aids. Their use is recommended in the Constitution of UNESCO, and in many educational systems. Not only in the United States but in other countries, extensive experiments are being conducted with such media. Undoubtedly the use of audio-visual aids in the training skills during the war years contributed a great deal to the advancement of the movement. The development and use of mass media are important in education, and their value for instructional purposes will in all probability increase as research into their effectiveness is promoted.

There appears to be a tendency, however, to look upon the new devices as themselves capable of becoming instruments of learning. This tendency is perhaps more marked in the United States than elsewhere and is comparable to the widespread reliance on textbooks as vehicles of instruction. To suggest that this faith is somewhat naive is not to decry the value of mass media as useful and important supplementary aids in the process of education and instruction. No instrument or device has yet been discovered that can take the place of a competent teacher, as was shown in the depression years when one of the leading cities of this country attempted to economize on teachers by utilizing the radio for instruction in the fundamental subjects. The successful use of broadcasts and films for educational and instructional purposes requires careful preparation in advance and effective discussion to follow their presentation. To rely on mass media as instruments of learning—rather than as supplementary aids to learning—would be analogous to an assumption that appreciation of music can be cultivated merely by listening to it frequently without any guidance or direction on how to listen and what to listen for. The same is true of art and literature.

The essence of the problem of the use of mass media may be illustrated by the refusal of the Russian peasant to allow a radio to be installed in his village, when he was informed that he would be able to listen to broadcasts from Moscow but would not be able to answer back. It was probably to meet a challenge such as this that in some countries "listening groups" under skilled leaders have been organized. Much still remains to be done to cultivate taste in the selection of broadcasts and moving pictures, even for entertainment. Far more difficult is the task of developing appropriate methods for the effective use of mass media for educative purposes. The media may be directed to the masses, but it is as individuals that man learns, and to promote successful learning the teacher or group leader or guide cannot be dispensed

with; otherwise many may be reached but few will be taught. Beyond that there is still the question whether a broadcast (or a film) on a world scale, except on highly special or ceremonial occasions, is yet possible for educational purposes. This question is not unlike the proposal made a few years ago to have international textbooks published; the question appeared simple until the names of writers from different nations began to be considered. The development of mass media of communication and learning is an important innovation, but the contribution that they can be expected to make is mainly as supplementary aids to instruction and education.—I. L. K.

THE READERS CATCH UP WITH THE EDITORS

SCHOOL AND SOCIETY is fortunate in having the cooperation of news bureaus and publicity departments of the various school systems and institutions of higher education throughout the country in providing for its news columns items of timely interest. The editors work on the assumption that reports from such sources are fairly accurate, and in most cases there is no question. Once in a while, however, the typewriters of even these reporters slip a line or jumble the type, and the result is a bit of misinformation in our columns.

In the number for September 20, for instance, we published an account of the establishment of a new junior college at the University of Denver and stated that it is "the only nonsectarian coeducational junior college in the Rocky Mountain Empire." Scarcely had the copies reached the Midwest, when in came a letter from a superintendent of schools in Utah saying, in effect, "It isn't so." "Utah has been operating nonsectarian coeducational junior colleges for many years. I suspect there may be a difference in the way they are financed." Back to the source of our Denver story went we and upon inquiry learned that: "Somewhere during the process of rough draft, final typing, and stenciling, the phrase, 'affiliated with a university,' was omitted." Now this is clear.

The University of Denver not only clears up its own lapses, but scans closely what we say about other institutions. The director of the university's School of Aeronautics takes exception to the claims made by the University of Illinois (SCHOOL AND SOCIETY, October 4) that it is the first to "give curriculum recognition to the needs of prospective teachers for some practical knowledge of the 'Air World.'" Here again the item as published in our columns was based on a special report from the university in question. The director continues:

> I would like to call your attention to the fact that the School of Aeronautics at the University of Denver has been offering such training for two years and, in addition to this, any student in the university may take flight training and ground school as an elective toward his degree.

Off went the "inquiring reporter" to learn wherein the trouble lay in this instance. The reply from the University of Illinois reads in part as follows:

> At Illinois all students who are preparing to teach are given flight experience as a regular part of one of the education courses in the sequence required for certification to teach. . . . This flight experience, incidentally, is free of any financial charge as far as the student is concerned. As far as we can discover, we happen to be the first institution to make flight experience a regular part of the required teacher-training program for all prospective teachers.

So much for the current arguments.

Small items also catch the eagle eye of readers. In the number for October 25 we reported that the Macmillan Company was to publish an "offset" edition of the UNESCO report, "Fundamental Education," edited by Henry W. Holmes. We have learned that the offset was not satisfactory and that a complete new edition of the publication has been brought out by the Macmillan Company and is now available.

In reporting the appointment of Hans Kohn, Sydenham Parsons professor of history, Smith College, as visiting lecturer at the New Jersey College for Women, Rutgers University, we were generous in giving him a middle initial. Here again, a source used some years ago in announcing another appointment was in error, and the error has persisted for five years.

On the other hand, we sometimes call forth additional information with our attempts to keep our readers up to date on what is going on in many aspects of education across the country.

In the number for October 4, we carried an account of certain changes in salary scales in colleges and universities. At the time the article was prepared, the University of New Mexico had just sent us their latest figures. Last month we received a letter from Philip Wernette, president, in which he states that since the earlier bulletin was issued the salaries have again been raised and that he would not like to have our readers feel that the university is lagging in the provision of better salaries for the teaching staff. In the slightly more than two years that Dr. Wernette has been in the presidency, the matter of salaries has been one of his chief concerns. "The medians for this year are as follows: instructors, $2,845; assistant professors, $3,545; associate professors, $4,050; and professors, $4,850."

Just as this goes to press, we find that even the printers play tricks on us. Because we know of their

extreme care we are sometimes careless in reading page proof, and now our collective faces are red, for in the Table of Contents for November 29, we see that we let the spelling of Dr. Brickman's name go through as Brinkman.

And so we, who devote our care and time to producing each week a journal that is as reliable and timely as possible, are grateful for the interest and initiative of our readers. This is as it should be, since SCHOOL AND SOCIETY is the property of the subscribers, and each and every one has a stake in its welfare and success.—L. R. B.

THE NEA AND THE ALA CO-OPERATE

THE joint committee of the NEA and the American Library Association, which met in Chicago, November 16–17, proposed the following program, to the end that children and young persons may best be served by the school-library service:

1. Every teacher to have instruction in the knowledge and use of library materials.
2. One librarian or library consultant to be appointed for every 1,000 school children to give all elementary and secondary pupils access to special library services.
3. Every state to make specialized library consultative service available through at least one library adviser in each state education department.

The meeting was conducted by Margaret I. Rufsvold, of the School of Education, Indiana University, representing the ALA. Other representatives of the ALA in attendance were: Sue Hefley, Louisiana State Department of Education; Marjorie L. Schramling, librarian of the public schools, Los Angeles; and Helen S. Benhoff, of the school department, Cleveland Public Library. The NEA was represented by Thomas H. Ford, superintendent of schools, Reading (Pa.); Sallie B. Robinson, a teacher in Clarksburg (W. Va.); Merle S. Ward, superintendent of schools, Valley City (N. Dak.); and Ada Wing, librarian of the public schools of Centralia (Wash.).

TEACHERS' SALARIES AND THE HIGH COST OF LIVING

NOTWITHSTANDING the fact that the average teacher's salary has been increased by 13 per cent over that of 1946, the beneficial effects have been offset by the higher cost of living, according to a report of the Sub-Committee on the Teacher in America of the Citizens Federal Committee on Education, an advisory group to the U. S. Office of Education. Improvements have been made in teachers' living and working conditions, retirement allowances, tenure, and sick leave. There are still 100,000 teachers, continues the report, who do not meet professional requirements for certification. To meet this situation, the report recommends that citizens check on educational conditions in their community, co-operate with civic groups in improving school conditions, become acquainted with their children's teachers, and encourage able young people to consider the career of teaching.

THE PENNSYLVANIA STATE COLLEGE'S FILMS

A RESEARCH project to produce more effective educational films has been started for the Navy Department at the Pennsylvania State College. The project calls for the establishment of a specialized reference library and an information center offering consultation and advisory services to the Navy and other government departments.

The researchers will study the appropriateness of various types of films in relation to specific subject areas. In addition, there will be analyses and evaluations of existing instructional films.

The project, which is directed by C. R. Carpenter, professor of psychology, will co-operate with other university and research institutes. M. R. Trabue, dean of the college's School of Education, is chairman of the advisory board of the project.

Notes and News . . .

Report on increase in memberships for week ending December 8: 6.

Appointments, Elections, Resignations, Retirements

THE VERY REVEREND FRANCIS XAVIER TALBOT, S.J., was inducted as the 20th president of Loyola College (Baltimore), December 3, by the Reverend Matthew G. Sullivan, S.J., vice-president and dean of the college. At the ceremonies the 95-year-old institution was "rededicated to the educational, cultural, and civic service of Baltimore, Protestant and Jewish as well as Catholic." Father Talbot succeeds the Reverend Edward B. Bunn, S.J., whose appointment as assistant director, Institute of Industrial Relations, University of Scranton (Pa.), was reported in SCHOOL AND SOCIETY, August 9.

COLONEL BLAKE RAGSDALE VAN LEER, whose appointment as president, Georgia School of Technology (Atlanta), was reported in SCHOOL AND SOCIETY, February 26, 1944, has been elected president, University Center in Georgia, for the year 1947–48, succeeding J.

McDowell Richards, president, Columbia Theological Seminary (Decatur). James Harris Purks, Jr., dean, College of Arts and Sciences, Emory University, has been granted leave of absence, January 1 to September, 1948, to serve as the first full-time director of the center.

PHILIP YOUNG, associate of William H. Schubart, banker and investment counselor of New York City, and former deputy lend-lease administrator, has been appointed dean, School of Business, Columbia University, to succeed John E. Orchard, professor of economic geography, acting dean, January 1. Dr. Orchard has been serving since the resignation of Robert D. Calkins in 1946. Professor Calkins's appointment as director of the General Education Board was reported in SCHOOL AND SOCIETY, December 12, 1946.

THREE new deans have been appointed in Cleveland College, Western Reserve University, in conjunction with the expansion of the college. Harlan W. Hamilton, head of the department of English, was named dean of the new School of Arts and Sciences in July; John P. Barden, former assistant dean, University College, the University of Chicago, assumed new duties in November as dean, School of General Studies; and Leslie E. Brown, director, department of debating and public discussion, Extension Division, the University of Wisconsin, will take up his duties as dean of administration, January 1. A dean of the new School of Business Administration has not as yet been appointed.

ACCORDING to a press release sent recently to the offices of SCHOOL AND SOCIETY, the Board of Regents of the University of Washington (Seattle 5) approved the following appointments, November 22: Arthur Philip Herrman received a change in title to professor of architecture and director, School of Architecture; Irwin S. Blumenfeld, was named assistant director of public information; Blake David Mills, Jr., was promoted to a professorship of mechanical engineering; and George Brown Eyerly was appointed assistant professor of mineral engineering. On December 1, the university announced that Robert B. Heilman, professor of English, Louisiana State University, has been appointed head of the department of English. Dr. Heilman, who will assume his new post in February, 1948, succeeds D. D. Griffith, who was retired last June. Joseph B. Harrison is serving as executive officer of the department in the interim.

THE REVEREND L. H. COLLOMS, formerly a member of the staff of Hendrix College (Conway, Ark.), has been appointed head of the department of Bible and philosophy, Union College (Barbourville, Ky.).

ANSON F. SHERMAN, professor of Romance languages and a member of the staff since 1925, Franklin and Marshall College (Lancaster, Pa.), has been appointed head of the department.

ON December 2, the Johns Hopkins University announced the inauguration of a two-year course in public-health and hospital administration in the School of Hygiene and Public Health and the appointment of Edwin L. Crosby, director of the Johns Hopkins Hospital, as adjunct professor. In addition to the appointment of Dr. Crosby, Madison B. Brown, assistant director of the hospital, was named to an assistant professorship, and as lecturers, P. J. McMillin, superintendent, city hospitals of Baltimore; J. Douglas Colman, executive director, Maryland Hospital Service; and Harry O. Humbert, controller, and Colin W. Churchill, director of employee relations, the Johns Hopkins Hospital.

WILLIAM H. BALDWIN, of Baldwin and Mermey, a public-relations firm of New York City, is conducting a series of ten informal seminars on public relations in the Graduate School of Business, Harvard University. The seminars, which are open to faculty members only, began on December 9 and will be held on December 16, January 6 and 20, February 17 and 24, March 9, 23, 30, and April 13.

BETTY MOLGARD RYAN has been appointed assistant professor of education, Eastern Oregon College (La Grande).

THE following appointments at Bethel College (Saint Paul 4, Minn.) were announced recently: Marina Axeen, librarian, and to the teaching staff, Violet Bergquist (Romance languages), Royal F. Bloom (education, psychology), Marion DeLaitsch (English), Walfred Peterson (economics), the Reverend Samuel Schultz (history, Bible), Mrs. Karl E. Karlson and Mrs. John Benson (music), Dalphy Fagerstrom and Reynold Wik (history), Ferdinand Schultz (history and political science), and Quenton Bohne (mathematics).

UNDER date of December 3, the following list of new instructors at New York State College for Teachers (Albany) was sent to SCHOOL AND SOCIETY: Harper F. Beaty (education), James E. Cochrane (English, supervisor), Elmer C. Mathews (English, secretary of the Teacher Placement Bureau), Paul B. Pettit (English), Anna E. Love (nurse), Karl A. B. Peterson (music), Harry S. Price, Jr. (social studies), and Lou Utter (art).

LOUIS BOOKER WRIGHT, whose appointment as visiting professor of English, University of California (Los Angeles), was reported in SCHOOL AND SOCIETY,

July 7, 1945, has been named director of the Folger Shakespeare Library, Washington (D. C.).

ROLLIN B. POSEY, dean, University College, Northwestern University, was recently elected president, Association of University Evening Colleges.

RUTH BETHEL, deputy to the superintendent of schools, Pierce County (Wash.), was named successor to T. Olai Hageness, superintendent, November 24. Mr. Hageness, whose appointment was reported in SCHOOL AND SOCIETY, October 17, 1942, has accepted a post as business manager and clerk, Clover Park School District No. 400, effective January 1.

Recent Deaths

CORRECTION: In reporting the death of Arthur Gordner Leacock in SCHOOL AND SOCIETY, December 6, there was an error in the date of death. Dr. Leacock died on November 27, not November 11 as announced.

HARRY MCKEE MCCULLY, head of the department of drawing and descriptive geometry, Carnegie Institute of Technology, died, November 29, at the age of sixty-one years.

EVANGELINE RACHELL HALL, director, Coppin Laboratory Practice School, and teacher of education and English, State Teachers College (Cheyney, Pa.), died, November 30. Miss Hall had served the college for forty-two years.

WILLIAM ESDAILE BYLES, retired instructor in philosophy and psychology, Hunter College (New York City), died, November 30, at the age of seventy-three years. Dr. Byles had served as master, Ampleforth College and St. Bede's Grammar School (England); master, St. Joseph's College (Ceylon); professor of philosophy, Cathedral College (New York City); and instructor in philosophy and psychology (1930–44), Hunter College.

THE REVEREND JAMES J. MCDERMOTT, S.J., professor of classics, Weston (Mass.) College, died, December 1, at the age of fifty-five years. Father McDermott had served as a member of the staff (1918–22), Canisius High School, Buffalo; teacher and dean of freshmen (1926–30), Boston College; member of the staff (1932–39), College of the Holy Cross (Worcester, Mass.); and at Weston College (since 1939).

RAYMOND HARMAN-ASHLEY, retired head of the department of chemistry, St. Lawrence University (Canton, N. Y.), died, December 1, at the age of sixty-seven years. Dr. Harman-Ashley had served as instructor and assistant professor of chemistry (1913–16), University of Maine; professor of chemistry and head of the department (1916–29), Premedical School, Tufts College; and head of the department of chemistry (1930–47), St. Lawrence University.

C. ELLIOTT SMITH, professor of real estate, School of Commerce, Accounts, and Finance, New York University, died, December 2, at the age of forty-seven years. Mr. Smith had served the university as instructor (1926–37), associate professor (1937–46), and professor of real estate (since 1946).

SAMUEL LAWRENCE BIGELOW, professor emeritus of general and physical chemistry, University of Michigan, died, December 3, at the age of seventy-seven years. Dr. Bigelow had served the university as instructor in general chemistry (1898–1901), assistant professor and director of the laboratory (1901–04), junior professor (1904–05), junior professor of general and physical chemistry (1905–07), and professor (1907–37).

WESLEY GEORGE FRANCE, professor of colloid chemistry and electrochemistry, the Ohio State University, succumbed to a heart attack, December 4, at the age of fifty-five years. Dr. France had served as assistant in chemistry (1917–20), University of Michigan; and at the Ohio State University as assistant professor of physical chemistry (1920–28), associate professor of colloid chemistry and electrochemistry (1928–32), and professor (since 1932).

WILLIAM ISAAC THOMAS, former professor of sociology, the University of Chicago, died, December 5, at the age of eighty-four years. Dr. Thomas had served as instructor in English and modern languages (1884–88), University of Tennessee; professor of English (1889–94) and professor of sociology (1894–95), Oberlin (Ohio) College; instructor in sociology (1895–96), assistant professor (1896–1900), associate professor (1900–10), and professor (1910–18), the University of Chicago; and lecturer (1923–28), New School for Social Research (New York City), and (1936–37), Harvard University.

ARTHUR GRAVES CANFIELD, professor emeritus of Romance languages, University of Michigan, died, December 5, at the age of eighty-eight years. Dr. Canfield had served as instructor in French (1883–85) and professor (1885–1900), University of Kansas; and in the professorship at the University of Michigan (1900–29).

PAUL MONROE, professor emeritus of education, Teachers College, Columbia University, died, December 6, at the age of seventy-eight years. Dr. Monroe, who was recognized as an authority on international education, had served as fellow and assistant in sociology (1897–99) and adjunct professor of the history

of education (1899–1902), the University of Chicago; professor of education (1902–25), director, School of Education (1915–23), director, International Institute (1923–32, 1935), and Barnard professor of education (1925–32, 1935), Teachers College; and president (on leave of absence from Teachers College, 1932–35), Robert College and Istanbul Women's College.

NICHOLAS MURRAY BUTLER, president emeritus, Columbia University, died of bronco-pneumonia, December 7, at the age of eighty-five years. Dr. Butler had served the university as assistant in philosophy (1885–86), tutor (1886–89), president (1886–91), Teachers College, adjunct professor (1889–90), dean of the faculty of philosophy and professor of philosophy and education (1890–1902), acting president (1901–02), president (1902–46), president, Barnard College and College of Pharmacy (1904–46), president, St. Stephen's College (1928–35), and president, Bard College (1935–46). His services to the country and in international relationships are too well known to be recounted here.

Coming Events

THE American Historical Association will hold its annual meeting in the Hotel Cleveland, Cleveland, December 27–29. Details of the program will be announced later.

THE 23d annual meeting of the National Association of Schools of Music, will be held in the Hotel Statler, Boston, December 27–30. The meeting immediately precedes the convention of the Music Teachers National Association to be held in the same place, beginning December 30.

MORE than 100 anthropologists and archaeologists, representing 40 institutions in all parts of the United States, will meet at the University of New Mexico, December 28–30. Panel discussions in the fields of linguistics, folk lore, ethnology, archaeology, and anthropology will be included in a program at the university for the first two days. On December 30, the group will move to the State Museum of Anthropology at Santa Fe, according to a report by W. W. Hill, head of the department of anthropology at the university.

Shorter Papers . . .

WHAT CAN THE JUNIOR COLLEGE DO?

TYRUS HILLWAY
President, New London (Conn.) Junior College

VARIETY of educational opportunity—such variety, for example, as may be found in the seventeen hundred colleges and universities of our country—constitutes, or ought to constitute, one of the chief glories of the American educational system. It may almost be said that any student with sufficient intellectual ability to profit by college work may study, in some recognized institution of higher learning, whatever area of subject matter he chooses to make his own. Most of us, it is true, have the tendency to raise our eyebrows when the seeker after variety ventures into a course in trout fishing. Others, a vocal minority just now, would abandon the ideal of variety and force all students through the identical mold of cultural and intellectual discipline, on the plea that specific problems can be solved by the application of universal principles and that these principles are the same today as they were yesterday. With such theorists, beautiful as their theories may sound, the majority do not at all agree; for it has long been an adage in American education that the needs of individual students differ just as the individuals themselves differ from each other.

We are pretty well committed, then, to the idea of infinite variety; and no type of institution in our system has more strikingly demonstrated our interest in a wide range of educational opportunity for every kind of student than the junior college. I should be hard pressed to find an easy definition for the junior college, other than to describe it as a two-year college. Beyond that we enter into difficulties; for there is much variety. If one were to search for a single reason to account for the tremendous growth of the junior-college movement in America during the past decade, I should suppose it to be that very variety of which we have been speaking. Not only does it provide a logical variation in the steps of our educational ladder, but variety within the institutions themselves is wellnigh infinite.

But from an objective, theoretical, and philosophical point of view, can the mere fact that the junior college provides a variation in the pattern of our higher education justify the increasing popularity and influence of this institution? I am not at all sure that it can, and I frequently have asked myself what other purposes the junior college may serve in our system and what besides mere variety there may be to justify it.

The early supporters of the junior college, like President Harper of the University of Chicago, were likely to stress the fact of its usefulness in recruiting students to the four-year college. A student, they said, might lack the courage to undertake a program

lasting four years, but he might be brave enough to attempt a two-year course of study; and success in this might encourage him to go even farther. Even if he did not, a two-year program was better for him than none at all, they argued. Furthermore, they recognized the natural division of the four-year program into lower and upper divisions, and they saw in the junior college two years devoted to broad and general studies, with specialization in the upper division after transfer to the senior college.

Modern educators are more likely to stress the terminal advantages of the junior-college curriculum. While presumably eschewing vocational education, the senior institutions continue merrily their training of teachers, and the professional schools turn out lawyers, physicians, ministers, accountants, and engineers. Why, then, should not the junior college train for the semi-professions, in which opportunities for employment and the need for trained people are far greater? I think the point need not be labored. But the junior college, in this connection, serves another need as well, in that it may guide the student to the proper choice between the four-year program and the two-year terminal program. Only a very few of the best senior colleges have as yet been able to help the student effectively at this point. For the most part, the vast numbers of college matriculants who drop out before the junior year have nothing to show for their years in college but the record of a false start. Most of them could benefit if a terminal course were available to them, as it is in the junior college.

A less obvious advantage claimed for the junior college is the high quality of teaching which is possible there. The great universities point imposingly to the names of nationally recognized experts on their faculties. At the same time, they seldom make the mistake of wasting the talents of these great names upon freshmen and sophomores. Their major efforts are devoted instead to research and to the graduate student. In the junior college the faculty does not, except incidentally, engage in research. Attention centers upon teaching, and many four-year colleges have a great deal to learn from their younger sisters at this point.

What I mainly wish to present, however, is an additional justification for the junior college which has come within my observation and which, so far as I am aware, has never been presented to public notice. This is the effect upon the student of nonacademic activities in the two-year program. It is a phenomenon which occurs in the junior college so frequently that it assumes the aspects of a definite pattern. Let me describe it in this way: The reason for a student's lack of success in a college program is not always an academic one. Frequently the student fails or gives up the effort because of poor social adjustment. In his first year he is a newcomer and is made to feel conscious of his inferiority. He rarely holds office in a student organization. His second year is much the same, although he has now been accepted as a member of the college group. In his third and fourth years he begins to hold office and exercise the leadership for which he has been prepared.

But observe the junior-college student. Almost from the very start he is forced into a position of active participation and leadership in student affairs. During his second year he is in the position of a senior. His leadership is already being tested. At the same time, the atmosphere of the junior college, with its concern for only two classes of students rather than four, encourages him in the development of mature judgment. Perhaps this rather than merely academic achievement is the reason for the comparatively greater success of junior-college transfer students in the senior colleges.

I do not mean to advocate, of course, the elimination of the lower division in the four-year college. I do not pretend that all students, or even the majority, should attend the junior college before going farther. I continue to believe that a student who seeks the baccalaureate degree should, under normal circumstances, enter the four-year institution as a freshman. I hope I have pointed out, however, some reasons for the justification of the junior college in our system of higher education. Much lack of understanding, I am afraid, still exists among our older educators as to what this infant prodigy can do and how it complements rather than duplicates the work of the traditional college and university.

THE CONTROL OF THE DOCTOR OF EDUCATION PROGRAM

WILLIAM O. STANLEY and LINDLEY J. STILES
College of Education, University of Illinois

IN 1930 Walter S. Monroe found that only six institutions of higher learning were granting the Doctor of Education degree.[1] But by 1945 Clifford Woody discovered that 31 institutions (approximately 65 per cent of all institutions granting any type of doctor's degree in education) had programs leading to the Doctor of Education—an increase of more than 500 per cent in fifteen years.[2] Moreover, in 21 of the 27 institutions offering both the Doctor of Philosophy in Education and the Doctor of Education,

[1] SCHOOL AND SOCIETY, 21: 655, May 17, 1930.

[2] "Requirements for the Degrees of Doctor of Philosophy in Education and Doctor of Education," Monograph I, The National Society of College Teachers of Education, Ann Arbor Press, Ann Arbor, Michigan, 1947, p. 4.

at least 50 per cent of the students taking doctorates in education elected the latter degree, while in twelve of these institutions more than 75 per cent of the students chose the Doctor of Education.[3]

It is axiomatic that rapid growth is almost invariably accompanied by the emergence of more or less serious problems in nearly every phase of a project; and, in this respect, the Doctor of Education program affords no exception. Among these problems at least two are crucial: (1) the role of the Doctor of Education degree in the advanced training of professional workers in education and (2) the locus of authority in determining the policies governing this degree. Ample evidence of the significance of these two problems may be found in the discussion now prevalent on the campus of almost every college of education and in the growing concern with these issues displayed in the recent studies and conferences of such important educational bodies as the National Society of College Teachers of Education and the American Council on Education.

The impetus behind the phenomenal development of the interest in the Doctor of Education degree comes from the feeling, justified or not, on the part of both the faculties of colleges of education and the workers in the public schools that the Doctor of Philosophy degree does not provide the type of graduate study needed by leaders in the field of public education. It is interesting to note that in this respect the protest of the colleges of education against the narrow confines of the Ph.D. program parallels the earlier protest of such great educational leaders as Gilman, Eliot, Hall, and Harper against the narrow confines of the classical curriculum which dominated graduate work in the United States prior to the esablishment of Johns Hopkins University in 1876.[6] Inspired by the German ideal of scholarship and the American emphasis on social reform and utility, these leaders, in order to promote graduate work relevant to the social and occupational needs of the modern world, sought to free graduate study from the theological and classical influences governing the liberal-arts colleges of the late nineteenth century. Keenly aware of the intimate relationships between structure and function, they insisted that these purposes could be achieved only by organizing graduate study under the jurisdiction of graduate schools separate and distinct from the faculties of liberal-arts colleges. Thus a genuine concern for occupational and professional competence and for social improvement and usefulness, as well as for the German ideal of scholarly research and freedom of teaching, was a significant factor in the establishment of the graduate school in American universities. In time, however, as Hollis indicates, two factors—the increasing influence of the faculty of the liberal-arts college on the graduate school and the necessary but limiting drive towards standardization—have frozen the Ph.D. program into a pattern which, while excellent for some purposes, has lost much of the breadth, plasticity, and social vision with which the founders of the graduate school originally intended to endow it.[5]

Nowhere has this loss been more sharply felt than in the field of education. During the past thirty years public education has experienced the impact of four seminal forces: (1) the expanding knowledge of child growth and development; (2) the increasing awareness of the close interrelationships between education and cultural change in a period of severe social crisis; (3) the growing feeling that pupils, teachers, and parents should participate with school administrators and educational experts in the solution of educational problems through democratic group processes; and (4) the developing need of highly competent educational leaders who, while thoroughly grounded in educational research, possess in addition those personal qualities and breadth of training requisite to a high type of educational statesmanship. As a result of this impact an insistent demand has been created for a type of advanced study not adequately provided under the narrow specialization typical of Doctor of Philosophy programs. Constant resistance from graduate schools, due in part to respect for the traditional requirements for the Doctor of Philosophy, in part to the residue of the long battle to standardize the requirements for the degree, and in part to lack of understanding of the problems of the public schools, has made progress in this direction extremely slow. Consequently, colleges of education have in increasing numbers devoted their efforts to the development of a new degree designed to meet these standards. It would seem reasonable, therefore, to conclude that the Doctor of Education degree has no meaning unless it provides a distinctive program in the service of a distinctive purpose.

This raises the question—a question frequently posed by those interested in the Doctor of Education degree—as to whether such a program can be developed under the control of those who are primarily interested in the traditional graduate degree and, for the most part, are inadequately informed about the needs of public schools. For while it is true that adequate organization and control do not in themselves insure satisfactory results, nevertheless, poor organization and control inevitably hamper achievement.

Hence the location of the control of the Doctor of

[3] *Ibid.*, p. 5.

[4] Hollis, Ernest V., "Towards Improving Ph.D. Programs," American Council on Education, Washington, D. C., 1945, pp. 1–21.

[5] *Ibid.*, pp. 12–32.

Education program is obviously important. In order to ascertain what the prevailing practice in this respect is, the writers recently directed a short questionnaire to the 31 schools which, according to Woody's study,[6] are now offering the Doctor of Education degree. The fact that every institution addressed promptly and cordially responded is perhaps indicative of the interest in the issue.

To the inquiry as to which division of the university had formal or legal control of the Doctor of Education degree (*i.e.*, with respect to the selection and organization of courses, the approval of staff and advisers, the definition of requirements for the degree, the responsibility for the admission of students to candidacy, and the recommendation for the granting of the degree 19 of the co-operating institutions indicated that this power was vested in the graduate school, 12 that it was vested in the college of education. To the same inquiry with respect to the Master of Education degree, 18 institutions indicated that the legal control of the degree rested in the graduate school, 10 that it was delegated to the college of education, and three that the degree was not offered. These figures do not include those institutions offering the Master of Education degree but not the Doctor of Education degree; and it should also be noted that in some instances the Master of Education is a one-year degree paralleling the Master of Arts or the Master of Science in Education, whereas in other instances, such as the University of Illinois and the University of Southern California, it is an advanced two-year degree.

The situation with respect to *de facto* control is reversed. Seven of the co-operating schools reported that the actual control of the Doctor of Education degree was exercised by the graduate school, 24 by the college of education. The graduate school actually controlled the administration of the Master of Education degree in seven institutions; the college of education, in 21.

It has been argued that the character of these degrees, that is, whether they are graduate or professional, has a definite relationship to the question of control. Thirteen schools indicated that their Doctor of Education was both a professional and a graduate degree; eleven consider it a graduate degree; seven think of it as a professional degree. In virtually every instance the replies emphasized the fact that the Doctor of Education is fully as respectable as the Doctor of Philosophy, and in many cases comments suggested that those who reported that their degree was exclusively graduate or professional in character really felt that it was, or should be, both. It appears reasonable, therefore, to conclude that the general sentiment among the colleges of education granting the Doctor of Education degree is that the issue of "professional" or "graduate" is not significant.

The sharp divergence between legal and actual responsibility for the control of the Doctor of Education degree indicated by the above data is capable of two interpretations, both of which, according to Woody's study, have in fact been made in equal proportions by eight leading Midwestern institutions.[7] It would be possible to conclude, on the one hand, that, since colleges of education are in most instances actually directing the program, there are distinct advantages in maintaining the formal control of the degree in the graduate school. On the other hand, it could be urged that, since this split between theory and practice represents an anomalous situation which might, with changes in personnel and attitudes, develop into open conflict, the college of education should possess *de jure* as well as *de facto* control. A number of arguments have been advanced in support of both positions. It has, for example, been claimed that the retention of control in the graduate school lends prestige to the degree and carries with it certain administrative advantages. The most significant argument for this position, however, seems to be that inasmuch as the preparation of professional workers in the field of education ideally demands co-operation from many divisions of the university, the control of the Doctor of Education degree by the graduate school would encourage and facilitate the necessary interdepartmental co-operation. Conversely, those who believe that both the legal and actual control of the Doctor of Education should be vested in the college of education argue that administrative machinery can always be adjusted, that prestige ultimately follows achievement, and that genuine co-operation would actually be enhanced by enlarging the authority of the college of education. The most significant argument for this view, however, seems to be that *de jure* control by the graduate school threatens the full realization of the purposes for which the Doctor of Education program has been established. It has, for example, sometimes been said that the only significant difference between the Doctor of Education and the Doctor of Philosophy is the absence of the language requirement in the Doctor of Education program, a statement which derives some support from Woody's study of the requirements for the two degrees.[8] Nevertheless, the statement is probably too strong, but to the extent that it is true, the development which it indicates is unfortunate in view of the clear case which, as suggested in the first part of this article, can now be made for a distinctly different program

[6] *Op. cit.*, p. 5.

[7] *Op. cit.*, p. 38.

[8] *Op. cit.*, Chapter II, pp. 4–11.

in the training of educational leadership. Although such a condition may, in part, be due to lack of vision in colleges of education, coupled with some hesitancy to depart too readily from established patterns, it is likely that it is to a considerable extent due also to the fear on the part of colleges of education, even where they exercise a large degree of *de facto* control, that the graduate school will not approve radical departures from the traditional program.

Personally, the writers feel that at the present juncture both legal and actual control of the Doctor of Education degree should be lodged in the college of education, but it is clear that this issue will be debated on American campuses for some time to come. In this debate we must not lose sight of the fact that organization and control are intrinsically related to purpose and function. Nor can we afford to ignore the further fact that the maintenance of actual control in one body, while legal control is vested in another body, always represents a precarious balance which is in accordance neither with the principles of good administration nor with reasonable security in working relationships.

UNIVERSITIES AND THE INTEGRATION OF SCIENCE

THOMAS E. BENNER[1]

THE war damage to the faculty and program of the University of Vienna is lamented by scholars throughout the world. But out of great difficulties there can also arise great opportunities. You are undoubtedly now taking inventory of your traditions and of your objectives and considering the role which could be played by the University of Vienna in the reconstruction of Austria, of Europe, and of the world. If appropriate plans were now made for directing the growth of faculty, of library, and of laboratories, the university might become not only once more a world leader in specialized scholarship, but also a center of world attention as the initiator of programs aimed at the integration of knowledge, so greatly needed to guide us through the conflicts and confusions of the postwar world.

The typical university of today, in whatever country it is found, is somewhat like a rimless wheel. At the hub are certain formal types of learning, largely traditional. From this hub there are spokes which radiate outward, representing the several specialized fields of scholarship. The predominating tendency of these outward radiating fields of scholarship is to extend themselves centrifugally and in doing so to widen the gaps which separate one field of scholarship from another. This results in a kind of specialized disunity which needs to be balanced by provisions for integrating the advances made by scientific scholarship into a unified and meaningful whole.

In a world which desperately needs co-operation and common understanding, universities have an important responsibility for increasing the integration of specialized scholarship into larger patterns of knowledge and understanding. These larger patterns in turn could then be further integrated into a philosophy of science whose growth would parallel the growth in the individual fields of scientific specialization.

A single example of the need for integration will serve to illustrate my meaning. Throughout the world war-aggravated problems of conservation make vital the acquirement of better scientific understanding of the long-range interdependence of human life, animal, insect, and plant life, and other natural resources. Intelligent answers to pressing problems of conservation require the integration of knowledge from such diverse fields as anthropology, botany, zoology, entomology, ichthyology, mineralogy, geology, geography, sociology, psychology, and economics. We have long recognized the need for research in each of these individual fields but we neglect to provide similarly for research in the problems of conservation in which several fields are involved.

We university professors tend to be annoyed when it is suggested that our universities should add to their present devotion to centrifugal specialization a balancing provision for centripetal specialization. We are willing to admit the urgency of the need for the scholarly integration of the contributions of specialists in diverse fields. We are inclined to suggest, however, that the task of integration should be undertaken by some institution other than our own.

A new institution, however, would require the same distinguished faculty, libraries, and laboratories as our present universities. Such an institution would, therefore, of necessity, become not only a center for the integration of knowledge but also a university like those we already know.

Such a university, orienting its program both toward existing types of scholarship and also toward the integration of that scholarship into larger patterns of understanding would be a better place in which to educate teachers, the teachers of teachers, and other leaders of public opinion. It would be no less satisfactory as a center for educating specialists in the traditional fields.

[1] Dr. Benner, who has been Chief of the Education Division of the U. S. Element of the Allied Commission to Austria, returned to the University of Illinois at the opening of the academic year. He presented this paper on the occasion of public ceremonies held in Vienna on June 12 when, by election of the university senate, he was made an honorary member of the University of Vienna.

Correspondence . . .

LET'S HELP THEM ACHIEVE EARLY

HARVEY C. LEHMAN
Ohio University, Athens

[Here in America] We prolong childhood astonishingly. Is that wise or foolish? In my opinion, it is evil; but some excellent citizens hold otherwise. There can be no denying, though, that our educational system keeps us immature far into the years when the rest of the world is grown up.[1]

IN an article which appeared recently in this journal,[2] William W. Brickman defends the thesis that American universities should extend the doctoral program by a minimum of two years, his proposed program leading to the "super-doctor's degree." Although obviously made with the best of intentions, Brickman's proposal should not be adopted without critical examination of what it may lead to. This brief note is based upon the following facts and assumptions:

(1) The available evidence indicates that man's creative prime comes at (or very shortly after) the very beginning of adulthood, and is of relatively short duration.

(2) Formal education should *not* consume the individual's most creative years of life simply trying to get him ready! Such a practice would be like not permitting athletes to begin their competitive careers as soon as they were fit and "ready" to do so, but requiring them instead to spend two more years at pulleyweights and shadow boxing. Such a procedure probably would curtail their total athletic careers and lower their peak records, since they would have so much less of their prime in which to build up to their maximum.[3]

(3) The time factor (beyond a certain minimum) is *not* an all-important, or even the most essential, factor in the educative process.

(4) There is a chronological age beyond which full-time formal education should not continue. If the number of years required for completion of the student's formal education continue to be increased, the time will arrive (if indeed that time is not already here) when the meeting of formal educational requirements will of itself constitute almost the entire intellectual life work of those who meet the requirements.

(5) Individual differences in the ability to think are enormous—much greater than are age differences in such ability from adolescence to senescence—and those who are able to think at all are often able to do it at amazingly youthful ages. In the words of a recent popular magazine article "some grow up young."

For 26 groups of creative thinkers in various fields of endeavor the present writer computed the correlation ratios between age of starting to contribute and total number of top-notch contributions. The correlation ratios ranged in size from −.31 to −.69 with a median of −.43. These data suggest what ought to be apparent even in the absence of statistics, *i.e.*, that the earlier one starts to contribute the more productive one will be. At this point some readers may object with the remark that life should consist of more than research effort. Granted that this observation is valid, it is true also that life should consist of more than the garnering of college degrees and other such baubles.

History reveals that those destined to achieve much have usually started to achieve early. Instead of extending for our most brilliant youths the number of years required for the completion of their formal education, it would probably be better to tell young people frankly that: (1) it is later than they think, (2) they should not delay putting forth their best efforts until they become middle aged, (3) if they have anything original in them it should begin to come out while they still look on the world with the clear eyes of youth and while they still burn with enthusiasm and ambition.[4]

The median age at time of receiving the Ph.D. for American scientists listed in a 1914 scientific "Who's Who" was 30.[3] Professor Brickman proposes in effect that we prolong childhood for our intellectually most elite to age 32. It would be hard to find a more effective way to keep really able young men from becoming college teachers. Surely, such a requirement would force many of them to enter other professions. Let us help them to achieve early while they still have the urge to do it and while they are still young enough for their achievement to do them some good. Certainly, young people should not be required to spend more years at shadow boxing than is required of our present-day Ph.D.'s.

[1] W. B. Pitkin. "Life Begins at Forty." New York: Whittlesey House, 1932.
[2] W. W. Brickman. SCHOOL AND SOCIETY, July 19, 1947.
[3] S. L. Pressey. *The Journal of Psychology*, 18: 217–234, 1944.
[4] R. S. Woodworth and D. G. Marquis: "Psychology." Fifth edition. New York: Henry Holt and Co., 1947, pp. 300–302.

RECENT Publications

BERNE, ERIC. *The Mind in Action.* Pp. xxi + 320. Simon and Schuster, 1230 Sixth Ave., New York. 1947. $3.00.
A layman's guide to psychiatry.

COLLIER, JOHN. *The Indians of the Americas.* Illustrated. Pp. xi + 326. W. W. Norton and Company, 101 Fifth Ave., New York. 1947. $3.75.
Recounts the story of the Red Indians from the Paleolithic Age to the present.